UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7248

CSAH NO. 3

OVER THE

RED LAKE RIVER

DISTRICT 2 - PENNINGTON COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 161)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7248, Piers 1 through 3, were found to be in good condition with no defects of structural significance observed. No appreciable changes have occurred to the footing exposure at the columns of Pier 2 since the previous inspection. The channel bottom appeared to be in stable condition, however, noticeable changes including shoreline erosion and both channel aggregation and degradation were observed at the bridge fascias. A large amount of timber debris has accumulated at Piers 1 and 2 since the last inspection.

INSPECTION FINDINGS:

(A) A scour pocket, 2 to 3 feet in radius with a depth of 1 foot, was observed at the upstream nose of Pier 2. The scour pocket exposed the top of the footing around the column and 3 inches of the vertical face at the upstream end.

(B) Light scaling and random pop outs of the concrete surfaces were observed around all columns on all piers from 2.5 feet to 3.5 feet below the waterline with a maximum penetration of 1/8 inch.

(C) A heavy accumulation of 2 foot diameter and smaller timber debris was observed extending from the west shoreline to 20 feet east of Pier 1 and 15 feet upstream of the pier. The debris extended from the channel bottom to 5 feet above the waterline at the upstream column of the pier and from the channel bottom to 2 feet above the channel bottom along the shore side of the pier.

(D) A heavy accumulation of 1 foot diameter and smaller timber debris was observed at the upstream column of Pier 2 extending from the channel bottom to the waterline and 1 to 3 feet upstream of the column.

(E) A heavy accumulation of 1-foot-diameter and smaller timber debris was observed at the downstream column of Pier 2 extending from the channel bottom to 3 feet above the waterline and 5 feet upstream of the column.

(F) A 10 foot long section of steel sheet piling was observed protruding from the channel bottom up 1 foot at the north end of Pier 3.

(G) Both the west and east banks exhibited signs of erosion since the last inspection conducted in September of 1997.

RECOMMENDATIONS:

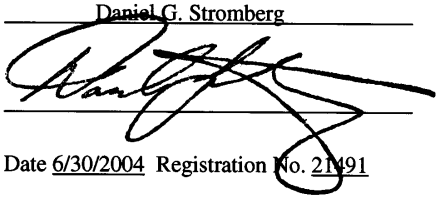
(A) Determine the significance of the footing exposure at Pier 2 by reviewing the design drawings to determine if the pier footings are founded on piles. If the columns are founded on piles, monitor the extent of footing exposure during future inspections. If the columns are founded on spread footings, then countermeasures may be required.

(B) Remove the heavy accumulation of timber debris at Piers 1 and 2 to eliminate the potential for continued accumulation and to halt any scour or erosion influenced by the accumulations.

(C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

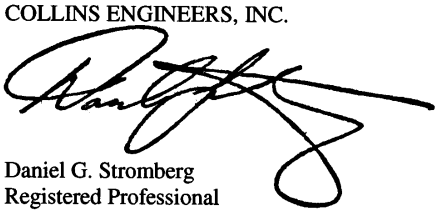
Daniel G. Stromberg



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7248

Feature Crossed: The Red Lake River

Feature Carried: CSAH No. 3

Location: District 2 - Pennington County

Bridge Description: The superstructure consists of four spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and three reinforced concrete piers. No design drawings were available to determine foundation type.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E.
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 27, 2002

Weather Conditions: Sunny, ± 80^{o} F

Underwater Visibility: ± 2.0 Feet

Waterway Velocity: ±2.0 fps

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3

General Shape: The piers each consist of two hexagonal reinforced concrete columns supporting a rectangular reinforced concrete pier cap. The columns are founded on rectangular footings, but it is unknown if the footing are spread type or pile supported.

Maximum Water Depth at Substructure Inspected: Approximately 9.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the downstream end of Pier 2.

Water Surface: The waterline was approximately 11.2 feet below reference. Assumed Waterline Elevation = 88.8.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

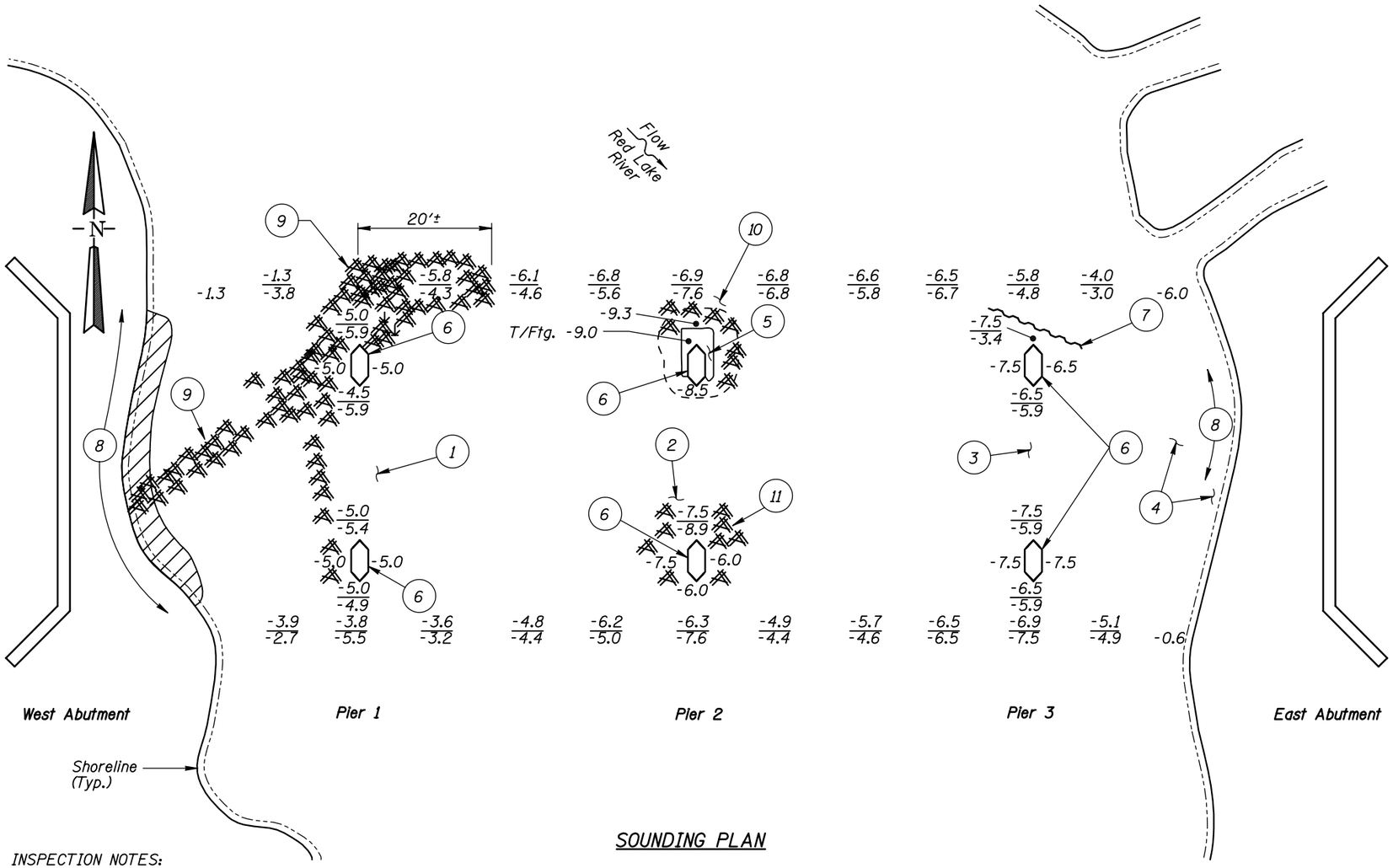
Item 61: Channel and Channel Protection: Code 5

Item 92B: Underwater Inspection: Code B/08/02

Item 113: Scour Critical Bridges: Code I/94

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

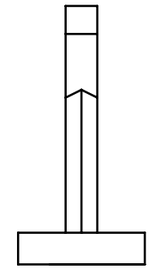
_____ Yes __X__ No



SOUNDING PLAN

GENERAL NOTES:

1. Piers 1, 2, and 3 were inspected underwater.
2. At the time of inspection on August 27, 2002, the waterline was located approximately 11.2 feet below the top of the pier cap on the downstream end of Pier 2. Design plans were not available, therefore a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 88.8.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.



TYPICAL END VIEW OF PIERS

Presence or absence of piles could not be determined.

Legend

-3.6	Sounding Depth from Waterline (8/27/02)
-3.2	Sounding Depth from Waterline (9/8/97)
	Timber Debris
	Scour Depression
	Erosion Pocket

INSPECTION NOTES:

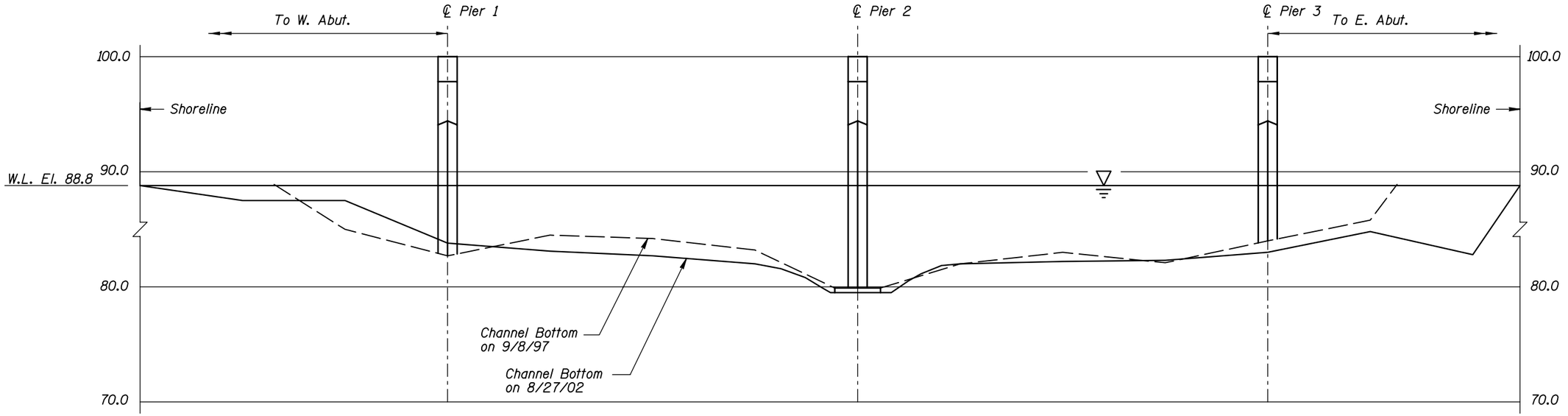
1. The channel bottom material consisted of soft, silty infill with 1.5 to 2 feet of probe rod penetration around Pier 1.
2. The channel bottom material consisted of sandy infill with 0.5 to 1 foot of probe rod penetration around Pier 2.
3. The channel bottom material consisted of fairly firm sandy gravel with 3 to 6 inch diameter cobbles and a probe rod penetration of 3 to 6 inches around Pier 3.
4. The channel bottom and shoreline of the east bank consisted of soft silty infill with 1.5 to 2 foot diameter riprap along the shoreline.
5. A scour pocket, 2 to 3 feet in radius with a depth of 1 foot, was observed at the upstream nose of Pier 2. The scour pocket exposed the top of the footing around the column and 3 inches of the vertical face at the upstream end.
6. Light scaling and random pop outs were observed around all columns from 2.5 feet to 3.5 feet below the waterline with 1/8 inch of maximum penetration.
7. Steel sheet piling was observed protruding from the channel bottom up 2 feet for a length of 10 feet.
8. Erosion pockets have developed along both embankments since the previous inspection.
9. A heavy accumulation of 2-foot-diameter and smaller timber debris was observed extending from the west shoreline to 20 feet east of Pier 1 and 15 feet upstream of the pier. The debris extended from the channel bottom to 5 feet above the waterline at the upstream column of the pier and from the channel bottom to 2 feet above the channel bottom along the shore side of the pier.
10. A heavy accumulation of 1-foot-diameter and smaller timber debris was observed at the upstream column extending from the channel bottom to the waterline and 1 to 3 feet upstream of the column.
11. A heavy accumulation of 1-foot-diameter and smaller timber debris was observed at the downstream column extending from the channel bottom to 3 feet above the waterline and 5 feet upstream of the column.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

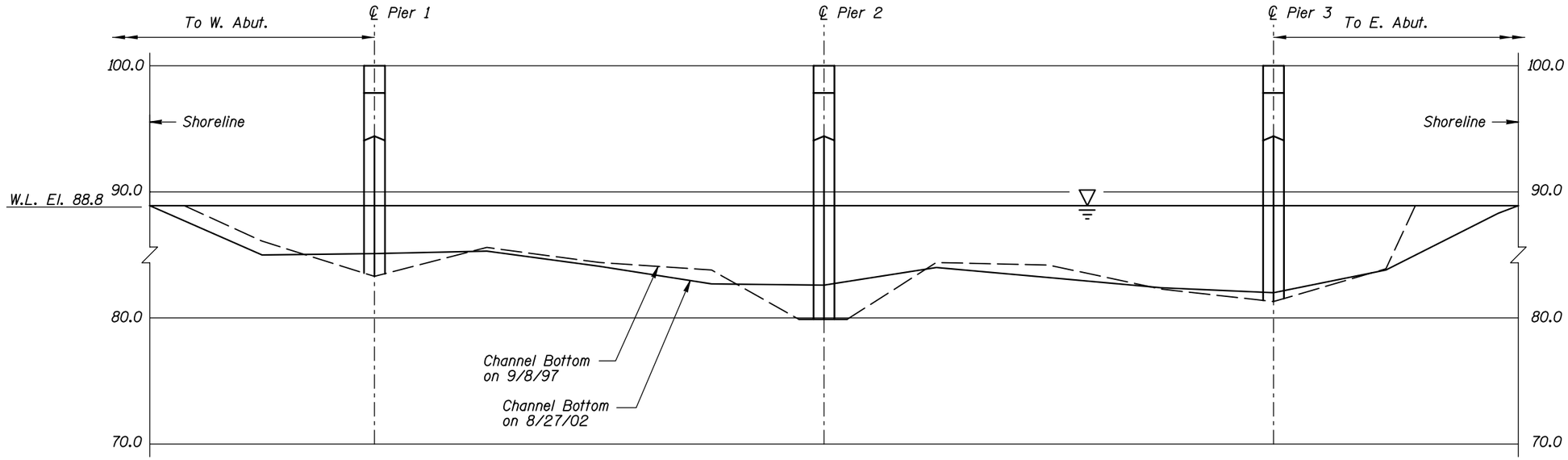
STRUCTURE NO. 7248
OVER THE RED LAKE RIVER
DISTRICT 2, PENNINGTON COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120161		Figure No.: 1



UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"



DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 7248
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DISTRICT 2, PENNINGTON COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS (U.O.N.)
Code: 35120161		Figure No.: 2

Photograph 1. Overall View of the Structure, Looking Southwest.

Photograph 2. View of Pier 1, Looking Northwest.

Photograph 3. View of Pier 2, Looking Southwest.

Photograph 4. View of Pier 3, Looking South.

Photograph 5. View of Timber Debris at Pier 1, Looking Southwest.

Photograph 6. View of Timber Debris at Pier 1, Looking Southeast.

Photograph 7. View of Timber Debris at Pier 1, Looking Northeast.

Photograph 8. View of Timber Debris at the Downstream Column of Pier 2, Looking East.

MINNESOTA DEPARTMENT OF TRANSPORTATION

OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 27, 2002

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.

BRIDGE NO: 7248 WEATHER: Sunny, "80° F

WATERWAY CROSSED: The Red Lake River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER

PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 2:45 P.M.

TIME OUT OF WATER: 3:37 P.M.

WATERWAY DATA: VELOCITY "2.0 f.p.s.
VISIBILITY "2.0 feet
DEPTH 9.3 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1, 2 and 3

REMARKS: Overall, the piers where found to be in good condition with no defects of structural significance observed. The top of the footing was exposed at the upstream column of Pier 2 with 3 inches of vertical face exposure observed at the upstream end. Light scaling of the concrete surfaces was observed on all columns from 2.5 feet to 3.5 feet below the waterline. A heavy accumulation of 2-foot-diameter timber debris was at the upstream column of Pier 1, extending from the channel bottom to 5 feet above the waterline, to 15 feet upstream of the column, to the west shoreline, and to 20 feet into the center span. There was also a heavy accumulation of timer debris at both columns of Pier 2 with up to 1-foot-diameter timbers from the channel bottom to the waterline. The heavy accumulation of drift has caused the west shoreline to develop a small erosion pocket.

FURTHER ACTION NEEDED: ___X___ YES _____ NO

Determine the significance of the footing exposure at Pier 2 by reviewing the design drawings to determine if the pier footings are founded on piles. If the columns are founded on piles, monitor the extent of footing exposure during future inspections. If the columns are founded on spread footings, then countermeasures may be required.

FURTHER ACTION NEEDED (CONTINUED)

Remove the heavy accumulation of timber at Piers 1 and 2 to eliminate the potential for continued accumulation and to halt any scour or erosion influenced by the accumulations.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7248
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491
WATERWAY CROSSED The Red Lake River

INSPECTION DATE August 27, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	5.0’	N	7	N	9	N	7	8	6	6	5	5	7	N	N	8	N	N
	Pier 2	9.3’	N	7	7	9	N	7	7	N	N	5	5	7	N	N	8	N	N
	Pier 3	7.5’	N	7	N	9	N	7	8	7	7	7	7	7	N	N	8	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the piers where found to be in good condition with no defects of structural significance observed. The top of the footing was exposed at the upstream column of Pier 2 with 3 inches of vertical face exposure observed at the upstream end. Light scaling of the concrete surfaces was observed on all columns from 2.5 feet to 3.5 feet below the waterline. A heavy accumulation of 2-foot-diameter timber debris was at the upstream column of Pier 1, extending from the channel bottom to 5 feet above the waterline, to 15 feet upstream of the column, to the west shoreline, and to 20 feet into the center span. There was also a heavy accumulation of timer debris at both columns of Pier 2 with up to 1-foot-diameter timbers from the channel bottom to the waterline. The heavy accumulation of drift has caused the west shoreline to develop a small erosion pocket.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.